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Report of the Secretary-General

Addendum

Safe and environmentally sound management of radioactive wastes*

(Chapter 22 of Agenda 21)

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* The report was prepared by the International Atomic Energy Agency (IAEA) as task manager for chapter 22 of Agenda 21, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development (IACSD). It is the result of consultation and information exchange between United Nations agencies, international and national science organizations, interested government agencies and a range of other institutions and individuals.

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INTRODUCTION

1. This report reviews progress made in the implementation of the objectives set out in chapter 22 of Agenda 21 (Safe and environmentally sound management of radioactive wastes),[1] taking into account the decisions taken by the Commission on Sustainable Development on this subject at its second session in 1994. In addressing issues related to the safe and environmentally sound management of radioactive wastes, chapter 22 of Agenda 21 identifies two areas of global concern: management-related activities, including capacity-building, and international and regional cooperation, including strengthened international legal instruments. The present report is limited to results, changes, constraints and proposals for action. Underpinning the results are comprehensive programmes dealing with all aspects of radioactive wastes, primarily under the auspices of the International Atomic Energy Agency (IAEA), but also in specific areas in cooperation with the International Maritime Organization (IMO), the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the United Nations Environment Programme (UNEP) and regional organizations such as the European Union and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD).

I. KEY OBJECTIVES

2. The key objectives are to ensure the environmentally safe and sound management of radioactive wastes and to reinforce international cooperation to that end.

A. Management-related activities

3. The main management-related activity involves the application of the precautionary principle in decisions concerning new or extended activities generating radioactive waste. There is also need for States, in cooperation with relevant international bodies, to:

(a) Promote policies and practical measures to minimize and limit, where appropriate, the volume of radioactive wastes;

(b) Secure sites for the storage of radioactive wastes;

(c) Ensure that radioactive wastes arising from military activities are subject to the same types of strict safety and environmental regulations as those arising from civilian activities;

(d) Internalize, to the maximum extent possible, all costs related to waste management and the decommissioning of nuclear facilities;

(e) Demonstrate viable methods for the safe treatment, storage and disposal of low- and intermediate-level, long-lived and high-level radioactive wastes.

4. Suppliers of sealed radiation sources should accept the return of such sources and ensure their safe and environmentally sound management.

B. International cooperation and legal instruments

5. These objectives include the development and conclusion of an international convention on the safe management of radioactive wastes, including the prohibition of exports of such wastes except to countries with appropriate waste-management infrastructure and facilities; the development of international standards for radioactive-waste management; strengthening cooperation with and the provision of assistance to economies in transition in solving their urgent problems due to improper treatment and disposal of radioactive wastes; and the provision of technical assistance to developing countries for the safe management and disposal of radioactive wastes and for national capacity-building to that end.

II. SUCCESSES

A. Management-related activities

6. The Commission urged Governments to apply the precautionary principle - e.g., preparatory measures for final disposal - in decisions concerning new or extended activities generating radioactive wastes. In most countries with nuclear programmes, the preferred method for the disposal of long-lived radioactive wastes is its long-term isolation in a system of multiple barriers located in deep and stable geological formations. Through the IAEA and Nuclear Energy Agency of OECD, information is exchanged and peer reviews are organized - for instance, the Joint NEA/IAEA international peer review of the long-term safety analysis of the Waste Isolation Pilot Plant, a United States disposal facility expected to receive long-lived radioactive waste in the near future.

7. The Radioactive Waste Management Committee of the NEA (OECD) addressed the strategy for the final disposal of long-lived radioactive wastes from an environmental and ethical perspective. It considers that the ethical principles of intergenerational and intragenerational equity must be taken into account in assessing the acceptability of strategies for the long-term management of radioactive waste.

8. The concept of maintaining retrievability over longer time scales is gaining increasing favour. This allows for the emergence of better technical solutions or for different choices to be made by future generations. Retrievability can be achieved through stores designed to be continuously monitored and maintained or through sealed stores which can be reopened.

9. The large amount of accumulated radioactive waste from both civilian and military programmes is a cause for concern. The experience gained in Russia and

the Commonwealth of Independent States in this area can be shared globally. In February 1993 the Consortium d'assistance opérationelle aux pays de l'Europe de l'est (CASSIOPEE) was established to assist countries of Eastern Europe to develop radioactive-waste-management systems within the framework of the European Union's assistance programmes PHARE and TACIS. In 1995 a contact expert group was established under the auspices of IAEA to assist member States with cooperation in a number of Russian priority projects. In October 1996 the International Conference on Radioactive Waste: Storage, Transportation, Recycling; Environment and Human Impact was held in St. Petersburg.

10. There has been, in some advanced countries, a revival of research into ways of reducing waste volumes and the possibility of transforming longer-lived radionuclides into shorter-lived ones. IAEA has developed guidance on minimizing the production of radioactive wastes in the nuclear fuel cycle, on the recycling and reuse of materials from the nuclear fuel cycle and minimizing wastes from the decontamination and decommissioning of nuclear facilities.

B. Capacity-building

11. Regional training courses on the management of radioactive waste from nuclear applications are being organized by the IAEA. One was held in Santiago, Chile, in August 1996. A regional demonstration centre was established in the Cekmece Nuclear Research and Training Centre, Istanbul, Turkey.

12. At the Seminar on Radioactive Waste Management Practices and Issues in Developing Countries (October 1994, Beijing), China, emphasis was placed on the management of low- and intermediate-level waste arising from applications of radioisotopes in medicine, research and industry and from nuclear power generation. The status of radioactive waste management programmes in both developing and advanced countries was reviewed.

13. To reflect the high priority given to strengthening radiation protection, radioactive-waste management and the safety infrastructures, IAEA has initiated an interregional model project on upgrading waste management infrastructure. Action plans are prepared for each participating State, with commitments taken relating to the passing of legislation, the introduction of regulations, the establishment or strengthening of the regulatory authority, the provision of basic installations and of qualified staff, the conduct of inspections, and the organization of radioactive-waste handling and processing. Countries in each region cooperate in line with the concept of technical cooperation among developing countries. Some 50 countries in Africa, Western and Eastern Asia, Latin America and Europe are being targeted for this interregional effort, for which four regional experts have been appointed.

14. A sealed sources registry system has been developed, tested and made available to member States to assist them in managing and controlling their sealed radiation sources. Training has been given to system administrators in the use of this registry system.

C. Legal instruments

15. Regional conventions are in force to prohibit the import and dumping of radioactive wastes - for example, the Noumea Convention (1986), the Lomé IV Convention (1989), and the Bamako Convention (1991).

16. The Radioactive Waste Safety Standards programme includes the preparation of safety guides and practices covering all aspects of radioactive-waste management. This comprehensive series of internationally agreed documents complements and guides national standards and criteria. Two of the most essential documents, "Safety fundamentals: the principles of radioactive waste management" and "Safety standard establishing a national system for radioactive waste management", were published in 1995.

17. A draft convention on the safety of radioactive waste management is being developed under the auspices of IAEA and with the participation of UNEP, the Commission of European Communities (CEC) and NEA/OECD. Relevant provisions of Agenda 21 are being taken into account.

18. The 1993 IMO Code for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-level Radioactive Wastes in Flasks on Board Ships, which was elaborated in cooperation with IAEA and UNEP, has been subject to review and ongoing expert work in the competent bodies.

19. National measures against illicit trafficking in nuclear materials and other radioactive sources have been strengthened. Internationally, the relevant instruments are the Treaty on the Non-Proliferation of Nuclear Weapons, indefinitely extended in 1995, the safeguard agreements with the IAEA, the Convention on the Physical Protection of Nuclear Material, the Vienna Convention on Civil Liability for Nuclear Damage, and the Convention on Nuclear Safety.

III. PROMISING CHANGES

20. The relaxation of tensions with the cessation of the cold war has made available much previously classified information on matters relating to radioactive releases and their environmental impacts. This new source of environmental information has renewed interest and stimulated research on radionuclides in the environment. In many cases, the need to gain greater understanding of radionuclide behaviour in the environment is linked to plans for cleaning up the environmental contamination that resulted from weapons - production operations and the early days of nuclear fuel-cycle development.

21. The Government of France requested IAEA to perform a study to assess the full radiological situation in the atolls of Mururoa and Fangataufa, taking into account all past events of radiological significance. An international advisory committee was established to oversee the study, which is being carried out by some 60 experts from member States and ex officio experts selected by the South Pacific Forum, the United Nations Scientific Committee on Effects of Atomic Radiation (UNSCEAR), WHO and the European Community. It is expected that the study will be published early in 1998.

22. At an April 1996 nuclear safety summit in Moscow, the Government of Russia proposed the establishment of regional radioactive waste storage sites, financed and supervised by countries advanced in nuclear technology. The availability of such sites would enable Russia to accede to the 1993 amendment to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention). Japan is helping to build a liquid-waste processing plant in the far eastern part of the Russian Federation. A plant for treating liquid low-level wastes in the Arctic is being built in a joint effort between Norway, the United States and Russia. Norway, Russia and the United States signed an agreement in September 1996 for dealing jointly with nuclear and other waste stored or dumped in the Arctic.

23. IAEA has developed a computer-based record-keeping system to assist achieving effective control of sealed radiation sources, the Sealed Radiation Sources (SRS) registry, designed for use by national regulatory bodies and regional centres for tracking sources from the cradle to the grave. Technical assistance is offered to developing countries for enclosing and sealing radium sources for safe storage.

24. For the first time IAEA is initiating a survey of member States that are, or will be, engaged in the remediation of radioactively contaminated environments, the purpose of which is to collect data about sites that will require environmental restoration. This essential information will be used in the IAEA Environmental Restoration Programme, which provides technical support to member States engaged in such activities.

IV. UNFULFILLED EXPECTATIONS

25. While an awareness of the importance of radiation and waste safety has been achieved in most countries, in many cases that awareness has not led to the establishment of adequate national radiation and waste safety infrastructures.

26. Like other sectors of the economy in the republics of the former Soviet Union and certain developing countries, the nuclear industry is strapped for cash, and the problems created by the accumulation of radioactive wastes are given low priority. Incidents and accidents involving "uncontrolled" radiation sources continue to increase. In addition, poor documentation, incomplete registries and staff changes have hampered efforts to bring those sources under control. While international attention has been drawn to these problems, action to alleviate them is insufficient.

27. International guidance on clean-up criteria is lacking. Working groups of the International Commission for Radiation Protection (ICRP) and IAEA are currently studying the issue, which is complicated by the many different types of contamination. The main guidance which can be given internationally will be on a common approach to developing clean-up levels and on their use in decision-making.

V. EMERGING PRIORITIES

28. Regional training centres should be strengthened to provide for the demonstration of techniques for the processing and storage of radioactive waste from the application of nuclear techniques in medicine, research and industry.

29. It has become increasingly evident that poor practices and accidents in the early years of the utilization of radium, the production and testing of nuclear weapons and the uranium mining industry have left a legacy of contaminated land areas in many countries. Nuclear-weapons-testing activities have left land surfaces and subsurface zones contaminated, including the Nevada Test Site, in the United States, some atolls of the Marshall Islands, the Mururoa and Fangataufa Atolls in French Polynesia, Maralinga in Australia, and Semipalatinsk, Kazakstan. Weapons production has also resulted in spillages and unplanned releases - for example, at the facilities at Hanford, United States, and Mayak/Chelyabinsk, Russian Federation. Many wastes from military and civilian nuclear operations were in the past poorly managed, as evidenced by the dumping of nuclear fuel and other wastes in the shallow waters of the Kara and Barents Seas. IAEA has assessed the present and future radiological consequences of such dumping and will report the results and give recommendations relating to the feasibility of remedial measures to the London Dumping Convention by the end of 1996. In accordance with General Assembly resolution 51/10, IAEA will take the lead in coordinating the development of the clearing-house mechanism with respect to radioactive substances, in connection with the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities, adopted in Washington, D.C., in November 1995. There has been pressure to restore the Bikini Atoll of the Marshall Islands and expert groups have assessed the level of contamination and necessary protective measures.

30. Several challenges face countries as they plan and implement a national radioactive-waste-management programme: political, technical and ethical. It is the responsibility of each State with nuclear activities to establish a programme to face these challenges. Nuclear waste legislation has been delayed in several countries because of public opposition to waste repository sites. It is crucial to involve the public and local authorities in decision-making and to build public confidence in the principles that govern the safety of repositories and in waste management programmes. Much can be learned from "best practices" of States with long-established programmes.

31. Efforts should be intensified to complete, before the end of 1997, the drafting of the convention on the safety of radioactive waste management, harmonizing its provisions with existing legal instruments covering hazardous wastes and related matters.

Notes

[1] Report of the United Nations Conference on Environment and Development, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.